

## CALCULATING BUILDING MATERIAL QUANTITIES

Whether building a wall in the garden, laying a patio, adding an extension, converting a garage into an office or simply making a concrete path, one question is certain to crop up. "How much do I need?" It is probably one of the most important questions and one

that tends to cause the most confusion when trying to work out the answer. If you are planning a garden wall, for example, you will know the length and the height, but how many bricks will be necessary? Even more importantly, how many bags of Wickes bricklaying mortar

should you buy? There is nothing more frustrating than starting a job only to run out of materials part way through.



### BRICKWORK

Brick sizes vary slightly because of the way they are made but for ease of calculation the size of one brick is taken as 215 x 102.5 x 65mm and for normal brickwork the joint between the bricks both vertically and horizontally is 10mm.

When deciding how many bricks are required the thickness of the mortar joint is included into the calculations, making the measurement of the brick - 225 x 102.5 x 75mm. By adding the mortar joint thickness any slight variations in size for the bricks is taken into account.

When determining how many bricks are required you should first work out the area of the brickwork as follows:- Length of wall say 4m, height of wall say 0.5m, multiply the two figures together,  $4\text{m} \times 0.5\text{m} = 2$  square metres. Square metres are often written as 'm<sup>2</sup>' or 'sq.m'.

For an easy rule of thumb guide you should allow 60 bricks per square metre for the building of a single skin wall. This is known as a half brick wall and is shown in Diagram 1. The style is known as Stretcher Bond with only the long 'Stretcher' faces of the bricks visible.

In the example above for a 2 square metre wall you will need to multiply 2 (area of brickwork) x 60 (number of bricks per square metre) = 120 bricks.

If you intend constructing a one brick thick solid wall, as shown in **Diagram 2**, then you should allow for 120 bricks per square metre. So for a one brick thick solid wall you will need 2 (area of brickwork) x 120 (number of bricks per square metre) = 240 bricks. The visible ends of bricks are known as 'Headers'.

These figures do not allow for wastage or breakage, so it would be advisable to add a few extra to the order to make certain you do not run short. Normally 10% extra should be sufficient.

### KEEP INFORMED

- Look for other Good Idea Leaflets that could help you with your current project.
- Check that your Good Idea Leaflets are kept up to date. Leaflets are regularly changed to reflect product changes so keep an eye on issue dates.
- If you would like to be put on our mailing list for the Wickes Catalogue, call:  
**0845 274 1000**
- Visit our website at [wickes.co.uk](http://wickes.co.uk)

## Mortar

The next question to be answered is, how much mortar will I need? Wickes bagged **bricklaying mortar** is supplied to the correct ratio for general bricklaying to ensure a perfect mortar mix. (The weight of bags is approximately 25kg but this does vary depending upon the moisture content.) With our bricklaying mortar all that is necessary is for water to be added. However, if large quantities are required 25kg bags of Mastercrete cement and Major bags of building sand are available for you to make your own mix.

A bag of Wickes bricklaying mortar is sufficient for about 25 bricks, depending on the thickness of the mortar joints, so for a square metre of brickwork (60 bricks) 2 - 3 bags will be required.

So to find out how many bags of Wickes bricklaying mortar mix are required for the example wall measuring 4m long by 0.5m high and using 120 bricks we need to divide the total number of bricks (120) by 25 (coverage of one bag):-

$\frac{120}{25} = 4.8$  so 5 bags of bricklaying mortar are needed.

If the wall is to be built one brick thick using 240 bricks you would need:-

$\frac{240}{25} = 9.6$  so 10 bags of bricklaying mortar are needed.

To lay say 1000 bricks (16.5 square metres) as a single skin wall, approximately 0.3 cubic metres of mortar will be needed, or 40 bags of bricklaying mortar. If the wall is to be built as a one brick thick solid wall then you will need 60 bags of Wickes bricklaying mortar.

**NOTE: All calculations and quantities are approximate and the information supplied should be used for guidance only.**

## General

A bag of Wickes bricklaying mortar contains all the necessary ingredients to make a good quality mortar mix, which is suitable for most general purpose brickwork or blockwork. However, if you want to mix your own mortar the proportions for most general bricklaying purposes should be 1:5, that is one part Mastercrete cement to five parts building sand for bricklaying.

The mix may vary slightly depending on the type of structure being built. (See chart at the end of this section). The measurements can be by weight or, much more easily, by volume, such as the bucketful, but they must be constant for each batch mixed.

## NUMBER OF BRICKS & AMOUNT OF MORTAR REQUIRED (single skin of brickwork)

Sq.m. of brickwork	Number of bricks needed	Bags of bricklaying mortar (rounded up)
1	60	2.4 (3)
2	120	4.8 (5)
3	180	7.2 (8)
4	240	9.6 (10)
5	300	12
6	360	14.4 (15)
7	420	16.8 (17)
8	480	19.2 (20)
9	540	21.6 (22)
10	600	24

## NUMBER OF BRICKS & AMOUNT OF MORTAR REQUIRED (solid one brick thick wall)

Sq.m. of brickwork	Number of bricks needed	Bags of bricklaying mortar (rounded up)
1	120	4.8 (5)
2	240	9.6 (10)
3	360	14.4 (15)
4	480	19.2 (20)
5	600	24
6	720	28.8 (29)
7	840	33.6 (34)
8	960	38.4 (39)
9	1080	43.2 (44)
10	1200	48

For concrete blocks the calculations are a lot easier. Wickes medium density concrete blocks and Wickes aerated concrete blocks measure 450 x 215 x 100mm - both types can be used above or below ground.

You will need roughly 10 blocks per square metre of wall, and 2 bags of bricklaying mortar will be sufficient for 10 blocks. So for every square metre of block work order 2 bags of bricklaying mortar mix.

## NUMBER OF BLOCKS & AMOUNT OF MORTAR REQUIRED (single skin 100mm thick blocks)

Sq.m. of blockwork	Number of blocks needed	Bags of Wickes bricklaying mortar
1	10	2
2	20	4
3	30	6
4	40	8
5	50	10
6	60	12
7	70	14
8	80	16
9	90	18
10	100	20

One 25kg bag of Mastercrete cement and 5 bags of building sand will make a general purpose mortar of 1:5 mix - enough to lay about 140 bricks or about 35 concrete blocks.

If you are laying your brickwork in the cold weather, or are looking for greater workability and flexibility, **Wickes Mortar Plasticiser** should be added to the

mixing water, in the amounts shown on the packaging instructions. The plasticiser produces tiny air bubbles in the mortar to allow the water to expand in freezing conditions and to reduce the possibility of the mortar cracking. The plasticiser is the modern replacement for lime that was once used in mortar mixes.

### CHOOSING MORTAR MIXES FOR BRICKWORK

Type of construction	Proportions of Mastercrete Cement/Building Sand
External walls above d.p.c. level	1:5
External walls below d.p.c. level	1:4-5
Internal walls and inner leaf of cavity walls	1:6
Coping stones and sills	1:3
Parapets and domestic chimneys	1:4-5
Retaining walls	1:3
External freestanding walls	1:4-5
Manholes	1:4-5

### CHOOSING MORTAR MIXES FOR BLOCKWORK

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External walls above d.p.c. level	1:6
External walls below d.p.c. level	1:5
Internal walls	1:6
Parapets	1:6
External freestanding walls	1:5
Manholes	1:5

### CHOOSING A SUITABLE MORTAR MIX FOR RENDERING

Background material	Mix	u/coat	t/coat
Low suction such as hard dense clay bricks dense concrete blocks stone masonry concrete	Mastercrete cement /sharp sand	1:3-4	1:5
Normal suction such as average types of bricks clay blocks concrete blocks aerated concrete blocks	Mastercrete cement /sharp sand ALL RATIOS BY VOLUME	1:5	1:6

The **amount of water** needed to make a perfect mortar mix is also important. For a bag of bricklaying mortar about 2.5 litres of water will be required.

However, water should be added first in sufficient quality to allow it to be absorbed by the mix, then it is added little by little until the mix has the consistency of butter - slipping easily from the shovel but firm enough for the sides not to collapse when a hollow is made in the centre of the mix.

Mortar should be used within two hours of mixing, so only mix sufficient to be used within that time. A rule of thumb estimate is that it takes about 2.5 minutes to lay one brick. If the mortar stiffens slightly while you are working, bring the consistency back by adding a little water.

If the mix is too dry it will not adhere to the bricks properly, if it is too wet the mortar will simply ooze from the joint under the weight of the bricks.

**In the mixes above, note the use of different types of sand.**

### Types of sand & aggregates

Sand and aggregates are graded by the size and shape of their particles. A well graded sand for example, will have particles of different sizes - not all large and not all small.

#### Sharp sand

A rather coarse and gritty material. It is normally used with other, coarse aggregates for making concrete and floor screeds.

#### Soft sand

Known as builders or bricklayers sand this has smoother particles and is of a finer grade than sharp sand. It is mixed with Mastercrete cement to produce bricklaying mortar.

The test of a good quality sand is that it should not stain your hands when you squeeze it.

**Coarse aggregate** (Not stocked on its own by Wickes).

Basically this is gravel or crushed stone of sufficient size to be retained by a 5mm sieve up to a maximum size of 20mm. It is used to form concrete when mixed with sharp sand and Mastercrete cement.

### Ballast

Known as 'combined' or 'all-in' aggregate, this is a mix of sharp sand and coarse aggregate and is used for making concrete. The proportions of sand to gravel are not normally guaranteed but are acceptable for use in a general purpose concrete mix.

### Storage

Sand and aggregates should always be stored in a neat pile on a board or plastic sheet and should always be protected from dirt and rain by covering with a plastic sheet. This should be weighted down with bricks or similar heavy objects to prevent it blowing away.

### Concrete

Concrete is one of the most useful materials that can be used around the home. It can be used to create a paved area such as a path or driveway, or used as foundations to support a wall. Concrete is normally made from three basic materials - Mastercrete cement, sharp sand and coarse aggregate. Mixed together the three ingredients form a strong and solid structural material.

A mix is generally expressed as, for example, 1:2:4, which indicates 1 part Mastercrete Cement, 2 parts sharp sand and 4 parts ballast (gravel). There are varying mixes for different purposes and these are indicated shortly.

When the sharp sand and gravel are premixed this is known as all-in ballast (or all-in aggregate). In the example just described the mix would be expressed as 1:6 meaning 1 part Mastercrete Cement to 6 parts all-in ballast.

For convenience and to ensure a perfect mix, a bagged Wickes concrete mix is available. This has the correct amount of cement and all-in ballast and all that is necessary is for clean water to be added. Between two and three litres of water will be needed for each bag of concrete mix.

As a rule of thumb, one bag of Wickes concrete mix will cover an area of approximately 0.0125 m<sup>3</sup>. It is difficult to give exact figures as the sub-base for concrete work, which is normally hardcore or broken bricks, varies so much in shape and has voids to be filled.

### Mixing

The ballast should be thoroughly mixed before the cement is added. Mix in the cement until the dry pile has an even colour. Then the water can be added from a watering can. The mix is correct when you can make a series of ridges in the top surface by dragging the back of the shovel across. The surface of the concrete should be flat and even and the ridges should keep their shape without filling in.

Like bricklaying mortar, the mixed concrete should be used within two hours. It should also be noted that concrete dries fairly quickly to give a hard top surface but will not reach any real strength for at least seven days.

The weather is an important consideration when laying concrete. The water in the concrete mix must not be allowed to evaporate too quickly if the weather is hot, or freeze when the weather is cold. Once laid the concrete should be protected from the weather.

A polythene sheet laid over the surface and weighted down with bricks to stop it blowing away is ideal. This sheeting will protect the concrete from rain and most normal frost attack. It will also help prevent water evaporation in the summer months if the weather is too hot.

If the daytime temperature reaches 20°C or more, the concrete should also be given a light spraying of water at least once a day for a week. The concrete should be re-covered with the polythene after spraying, otherwise it may well crack and crumble.

In very cold weather add our Rapid Hardener and Frost Protective to the mix. This admixture reduces the initial and final setting time of concrete by about two thirds - helpful if frost is about.

## NUMBER OF BAGS OF WICKES CONCRETE MIX REQUIRED

Major bags concrete mix	Produces approximately this amount of concrete
15	0.19 cu.m
30	0.38 cu.m
45	0.56 cu.m
80	1.00 cu.m

As an alternative, if you wanted to make your own concrete you would need the following:-

### CONCRETE PATH. 8m LONG, 0.5m WIDE, 50mm THICK (using a mix of 1 part cement, 9 parts ballast - parts by volume)

Quantity	Material
2	25kg bag Mastercrete cement
17	Major bags all-in ballast
37 litres	clean water - approx.

Using totally separate materials this mix would normally be expressed as a 1:3:6 mix meaning 1 part cement, 3 parts of sharp sand and 6 parts of gravel. Using Wickes bags of all-in ballast the ratio to get the same volumes is as shown in the example.

### APPROXIMATE QUANTITIES OF MATERIALS TO MIX YOUR OWN CONCRETE

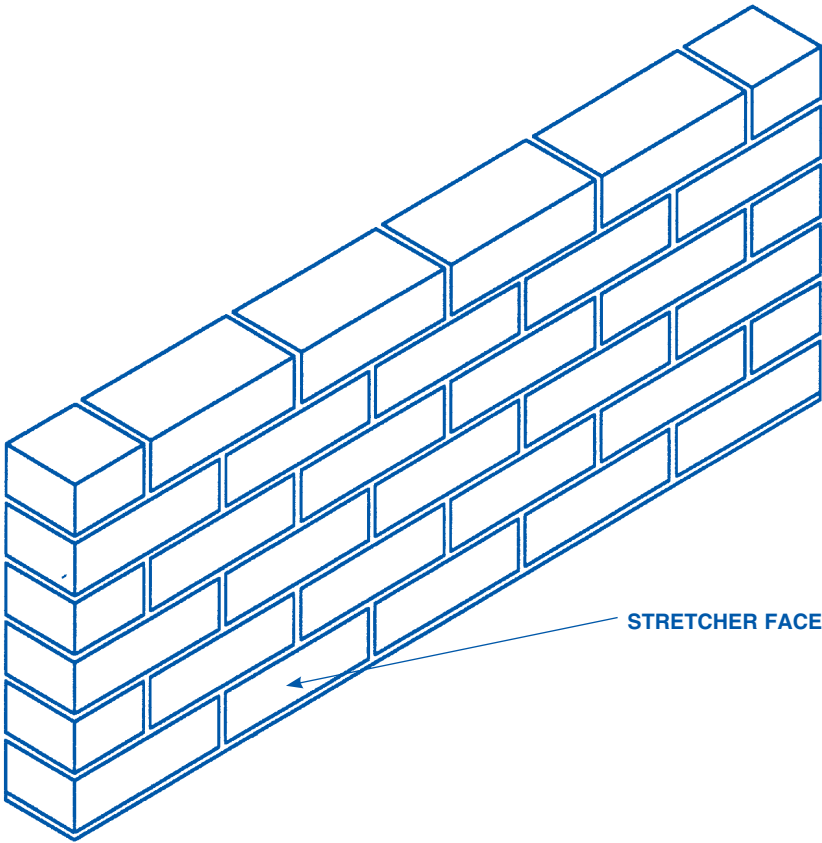
Bags of cement	Bags of all-in ballast	Water litres	Produces this amount of concrete
2	17	37	0.25 cu.m
4	34	74	0.50 cu.m
6	50	104	0.75 cu.m
8	67	150	1.00 cu.m

As sand in the ballast tends to absorb moisture from the atmosphere it is better to use different buckets for the ballast and cement, in order to keep the cement perfectly dry.

### TYPES OF CONCRETE MIX

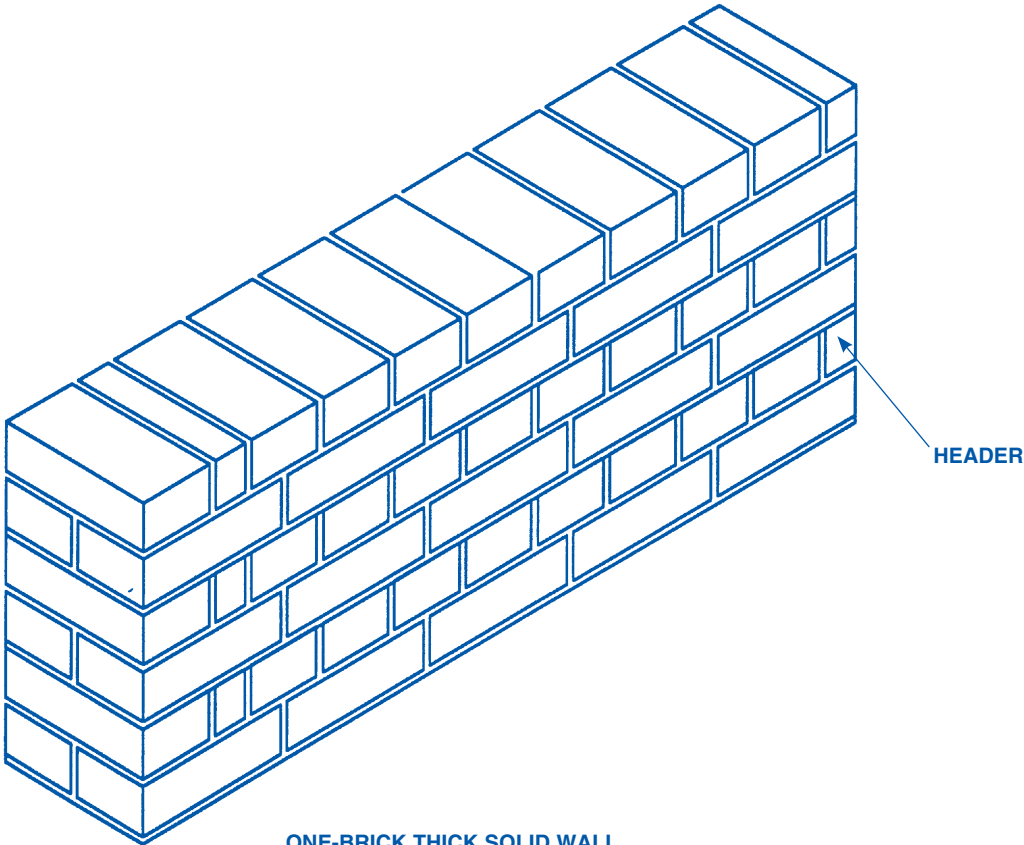
Use	Normal quoted cement/ sand/gravel. RATIOS BY VOLUME	Equivalent ratios using cement and Wickes bags of all-in ballast
Foundations	1:1½:3	2:8
Driveways, garage slabs and other heavy load areas	1:2:4	2:11
Paths, shed bases and other light load areas	1:3:6	2:17
Blinding layer for sub-floors etc.	1:4:8	2:21

DIAGRAM 1



HALF-BRICK WALL

DIAGRAM 2



ONE-BRICK THICK SOLID WALL



# WICKES JUMBO & MAJOR BAG COVERAGE AND VOLUME AMOUNTS

SKU	Jumbo Bag description	m <sup>2</sup> coverage at approximately 50mm depth*	m <sup>3</sup> per bag approximately*
220081	Sharp Sand	11m <sup>2</sup>	0.55m <sup>3</sup>
220082	Ballast	13m <sup>2</sup>	0.65m <sup>3</sup>
220080	Building Sand	11m <sup>2</sup>	0.55m <sup>3</sup>
224555	Pea Shingle	13m <sup>2</sup>	0.65m <sup>3</sup>
224665	Granular Sub Base	12m <sup>2</sup>	0.60m <sup>3</sup>
190538	20mm Gravel	13m <sup>2</sup>	0.65m <sup>3</sup>
190537	Plastering Sand	11m <sup>2</sup>	0.55m <sup>3</sup>
190536	Cotswold Buff Decorative Chippings	12m <sup>2</sup>	0.60m <sup>3</sup>

SKU	Major Bag description	m <sup>2</sup> coverage at approximately 50mm depth*	m <sup>3</sup> per bag approximately*
220012	Sharp Sand (as a render/floor screed)	0.225m <sup>2</sup>	0.0159m <sup>3</sup>
220111	Ballast (as a coarse concrete mix)	0.35m <sup>2</sup>	0.0175m <sup>3</sup>
220129	Building Sand	0.3m <sup>2</sup>	0.0156m <sup>3</sup>
220128	Pea Shingle (as a fine concrete mix)	0.35m <sup>2</sup>	0.0175m <sup>3</sup>
220189	General Purpose Concrete	0.24m <sup>2</sup>	0.0137m <sup>3</sup>

SKU	Major Bag description	m <sup>2</sup> coverage at approximately 15mm depth*	m <sup>3</sup> per bag approximately*
190537	Plastering Sand	0.7m <sup>2</sup>	0.0105m <sup>3</sup>

SKU	Major Bag description	m <sup>2</sup> coverage depends on block/brick type/size*	N/A
220201	Kiln Dried Block Paving Sand Major Bag	approx 3-6m <sup>2</sup>	
220174	Bricklaying Mortar	will lay approx 33 bricks	



**\*Important:** All coverages and volumes are approximate and for guidance only, they depend on the bulk density of the product relating to compaction and in the case of sand; moisture content and compaction.

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